craniology have a world-wide reputation, and the anatomy of the whale formed a favourite subject of research, in which he established a position as a great authority.

This unceasing activity in many spheres did not fail to bring recognition from numerous learned bodes as well as from the Crown. He was created a Knight in 1886, and in 1901 a K.C.B. His native town of Lancaster manifested the pride felt in his world-wide reputation by placing a commemorative tablet on the house in which he was born. Honorary degrees were almost showered upon him. He was an Honorary LL.D., D.C.L., D.Sc., and M.D. of one or other of almost every university in Great Britain and Ireland, and an honorary member of many academies and learned societies throughout the civilised world. It may be added that he was Honorary Lieutenant-Colonel of the Queen's Royal Volunteer Brigade, in the University Company, of which he was an original member at the beginning of the volunteer movement in the early sixties of last century.

Sheer ability and force of character were the weapons by which Turner carved his way to a distinction probably without parallel among his scientific and academic contemporaries. His strong personality gained for him success in the contests which could not be avoided in many of the interests and schemes he sought to advance. His honesty of purpose and soundness of judgment were always apparent, and much opposition was conciliated by his courtesy.

To many he was a dearly loved friend, whose constancy could always be relied upon. Originating, it may be, in the circumstance that both were Anglo-Scots, but probably even more because of the similar lines of biological research which early engrossed their thoughts, he formed a lifelong and very close friendship with Lister. The death of Lord Lister threw a light upon Turner's character and disposition by evoking outward manifestations of such suffering and pained emotion as even his intimate friends could not have anticipated.

How general was the affection and respect and admiration with which he was regarded was manifested in the ceremony which marked the closing of his career. A remarkably representative gathering assembled for the service in St. John's Church, preceding the interment in the Dean Cemetery, where many of his academic predecessors have their last resting place. It included the Lord Provost and Town Council of Edinburgh; the University Court, Senatus and Students' Union and Representative Council; the vice-chancellors and professors of the three other Scottish universities; representatives of the Universities of Oxford and London, of the Royal Societies of London and Edinburgh, of the Royal Scottish Academy and Geographical Society, of the Royal Infirmary, and of many other public bodies and institutions; while, also, Lord Kitchener, rector of the university, was represented by the Commander-in-Chief-in-Scotland.

## NOTES.

IN order to clear up any misunderstanding that may arise in consequence of recent legislation concerning reserved occupations, the Royal Society desires to point out that an unmarried chemist of military age entitled to exemption as an "analytical consulting or research chemist" should, unless he has been attested *before* March 2, lodge a claim for exemption with the local tribunal before that date. Men who have been attested should lodge their claims for exemption with the recruiting officer or local tribunal when called up for enlistment; and if such claims be not admitted, a communication stating all material facts in favour of the disputed claim should be addressed at once to the secretaries of the Royal Society, Burlington House, London.

WE learn with regret that Dr. P. Chappuis, the distinguished authority on gas thermometry, died at Basle on February 15.

MR. F. J. CHESHIRE, of the optical branch of the Ministry of Munitions, has been elected president of the Optical Society, in succession to Dr. W. Ettles.

THE death is anounced, in his sixty-ninth year, of Dr. R. G. Alexander, consulting physician to the Royal Infirmary of Bradford and Halifax. Dr. Alexander was a pioneer in the advocacy of open-air treatment of phthisis and other complaints. He was the author of "Phthisis: its Prevention and Treatment," and of "The Art of Prolonging Life."

WE regret to note from the *Engineer* for February 18 the death, on February 13, of Mr. T. de Courcy Meade, the city surveyor of Manchester. Mr. Meade had held his post in Manchester since 1894; his most important work was concerned with the development of the new drainage scheme. He also rendered useful service in connection with the city's town-planning schemes and the reform of slum areas. He was a member of the Institutions of Civil and Mechanical Engineers, and also of several other engineering societies. An account of his work in Manchester is given in a paper which he read in 1914 before the Institution of Municipal and County Engineers.

LIEUT.-COL. STANLEY BOYD, senior surgeon to Charing Cross Hospital, passed away on February 1, after a short illness. He was educated at University College Hospital, and was appointed assistant-surgeon to Charing Cross Hospital in 1882, and was lecturer in anatomy in the school from 1888 to 1897. He was a sound teacher and a brilliant operator, and was particularly interested in the operative treatment of malignant disease. Stanley Boyd was a keen advocate of the claims of women to be educated for the medical profession, and much of the success of the Women's School was due to him. He held strong views on the university question in London, and was one of those who advocated the concentration of medical teaching in a few centres. At the time of his death he was chairman of the Board of Advanced Medical Studies of the University.

BY the death of Lieut.-Col. J. W. Stokes, on February 10, the medical fraternity of Sheffield has suffered a great loss. While engaged in the arduous duties of a general practitioner in a highly populous district, he also acted as demonstrator in anatomy for many years in the University of Sheffield. His services in this direction were entirely voluntary, and were very much appreciated, owing to his regularity, punctuality, and the zeal with which he discharged his duties in the anatomical department. In addition to being a stimulating teacher, he helped materially to furnish the department with permanently mounted specimens, which were specially acceptable at a time when funds for equipment were very small. In his busy life he managed to find time to write on anatomical work, in addition to publishing papers dealing with medicine and surgery. His geniality and quiet humour, coupled with a frank, straightforward disposition, won for him great popularity with his colleagues and students alike.

THE Canadian Army Medical Corps has sustained a severe loss through the untimely death of Lieut.-Col. Bridge Yates. Born in Montreal in 1865, he was educated at Charterhouse and Cambridge University, after which he returned to Canada, graduating M.D., C.M., at McGill University. After graduating, he spent several months in Germany studying bacteriology, and on his return was appointed lecturer in bacteriology in McGill University. He early became interested in matters of public health, and in ambulance work. In recognition of his services he was appointed a Knight of Grace of the Order of St. John of Jerusalem, and later president of the Province of Quebec Branch of the Canadian Red Cross Society. He took an active part in the reorganisation of the Canadian Army Medical Corps, in 1907, and on the outbreak of war was appointed acting A.D.M.S. for the Montreal District. Col. Yates joined the McGill or No. 3 Canadian General Hospital in February, 1915, and organised the hospital buildings in France, where he contracted his fatal illness.

MR. J. B. JORDAN, news of whose death at Torquay on December 1, 1915, has just reached us, was for many years compiler and editor of the *Mining Record*, first at the Museum of Practical Geology and afterward at the Home Office. He was, however, better known in the world of science as the inventor of the glycerin barometer, which has almost the range of the water barometer without its disadvantages. The readings of this barometer were for a considerable period published daily in the columns of the *Times*. He also devised a simple form of a photographic sunshine recorder; this was apparently suggested by an eccentric genius, a secretary of the Coal Commission, who used coconut shells for the purpose with approximately correct results. Mr. Jordan was also an expert modeller; one of the finest examples of his work in this direction is the model of the Southampton Docks executed for the London and South-Western Railway. Other works of his are a geological section showing the order, superposition, and approximate maximum thickness of sedimentary strata in the British Isles, a geological map of London on the scale of 6 in. to one mile, based on Stanford's well-known map, and a model of London and its environs printed on tin and stamped in tolerably high relief, this last being a very ingenious, interesting, and useful map.

BY the death of Col. C. Stonham, C.M.G., senior surgeon to Westminster Hospital, on February 1, we lose not only a brilliant surgeon, but one who distinguished himself in other ways. He was educated at University College Medical School, where he held the posts of demonstrator of anatomy and curator of the pathological museum, and became assistant-surgeon to the Westminster Hospital in 1887. In early life he was an enthusiastic mountaineer, and as a member of the Alpine Club made some noteworthy climbs. While busily engaged in hospital work and private practice he found time to make observations on bird-life, formed a rare collection of British birds and their eggs, and published his "Birds of the British Islands," notable both for the bird-lore contained in it and for the beauty of the illustrations. Col. Stonham commenced his military service as surgeon in the Middlesex Yeomanry, and in the South African war organised and took out as surgeon-in-chief the Imperial Yeomanry Field Hospital, and for his services in this campaign was made a C.M.G. He afterwards continued his ambulance work and organised a mounted ambulance unit, which was ready for active service on the outbreak of war. He was ordered to Egypt, where he became inspector of hospitals, but his health failed, and he had to return to Europe at the end of last year. A man of striking personality, his untimely death is a great loss to his profession.

FROM a letter to the *Times* of February 18, by Prof. J. Joly, it appears that experiments which he has carried out in collaboration with Prof. H. H. Dixon show that the undressed swimmer immersed in water at 8° C. loses heat from the surface of his body very nearly three times as fast as the dressed swimmer. The explanation is simple, since the clothing limits the mobility of the water, and it is the constant contact of fresh cold water with the surface of the body which conveys the heat away (by convection, not conduction). The experiments also show that the downward drag of ordinary clothing in sea-water amounts to no more than the weight of 4 oz., and this only after all the air has been expelled from the material. These facts seem to justify the opinion expressed by Prof. Joly, that when there is a probability of prolonged immersion the discarding of clothes is a drawback rather than an assistance, and that the only condition which justifies stripping is the necessity for rapid swimming. Probably the authors would agree that in any case boots should come off.

THE general restriction of imports of papermakers' raw materials brings into prominence our growing dependence upon half-manufactured materials, in this case the pulps or "half-stuffs." In adjusting the incidence of the restriction to the various sections of the industry, it is to be noted that the proportion of labour and capital earnings and charges will be relatively less in the case of materials which work up such half-stuffs. On the other hand, the esparto mills are equipped for preparing and boiling the grass, and for recovering the soda ash used in the boiling, which gives a very different figure for mill costs per ton of output. As to a possible supply of indigenous fibrous material in substitution of the material to be excluded under this order, the only one practically available at the moment is straw. Straw was at one time quite a staple raw material, and was very largely worked at mills favourably situated in agricultural districts. The chemical treatment of straw for producing a bleached half-stuff (cellulose) is closely similar to that of esparto, but it requires a more severe boiling treatment, and the yield of cellulose is much less. Further, from its structural features, it cannot be economically or conveniently handled in the preparing and boiling plant of esparto mills. There is, however, a possibility of adapting this plant to the exigency.

A MEMORIAL has been presented to the Prime Minister and the Chancellor of the Exchequer, signed by many persons of influence, and among them by a considerable number of scientific and professional men and educationists. Its purport is to give emphasis to the demand for national economy, and to urge the necessity of retrenchment in official and municipal expenditure. It recognises that the national finances and the enormous demands made day by day in the prosecution of the war will render necessary heavy additional taxation and much larger savings, both by public bodies and private individuals, than have hitherto been effected. For the latter purpose authoritative guidance from his Majesty's Government is much to be desired. It is suggested, therefore, that a strong official War Savings Board should be constituted, which should lay down regulations for enforcing economy on Government Departments and on public authorities during the period of the war, and should also consider and report on the best means of advising and encouraging domestic thrift. It urges that these measures should be adopted without delay. The memorialists are no doubt addressing persons who will be in full sympathy with their objects. For ourselves we should have been disposed to add to the weighty considerations they have brought forward the importance of that other branch of thrift, which consists in judicious expenditure, and in applying to the best purpose the money which is being lavishly expended directly on the operations of the war, and indirectly on a great variety of objects more or less concerned with the war.

THE danger of relying on popular tradition in questions of archæology is illustrated by a recent case reported by the American Bureau of Ethnology. For many years the people of Georgia have believed that the Nacoochee Mound in White County dated back to the Spanish conquest, and was closely connected with a beautiful local legend. Mr. F. W. Hodge, who has recently excavated the site, finds that the word Nacoochee cannot be traced in the Cherokee language, and that it does not, as has been claimed, mean "Evening Star," a theory on which the legend was based. The mound is really of comparatively recent origin, was constructed by the local Cherokee Indians, and was in use by them until the nineteenth century.

STUDENTS of clan organisation based on the totemistic crest system will be interested in a careful study published as Bulletin No. 19 of the Department of Mines, Canada, which contains an account of the social organisation of the Nass River Indians, by Mr. E. Sapir. This tribe is divided into four exogamous phratries with maternal descent—that is to say, the crests and other privileges descend from a man to his sister's son, and a man's predecessor as the holder of any title or right is not his father, but his maternal uncle. These phratries are again divided into clans, each with a definite order of rank marked by the ownership of special crests, legends, songs, individual names, houses, hunting, and fishing territories, and numerous other inheritable privileges.

AT the monthly general meeting of the Zoological Society of London, held on February 16, it was announced that fifty-seven additions had been made to the society's menagerie during the month of January. The most notable of these were a specimen of Pere David's deer (*Elaphurus davidianus*), now extinct as a wild animal, and an Anoa (*Anoa depressicornis*), presented by the president, and two Argentine frogs (*Leptodactylus mystacinus*) and six South American sand toads (*Bufo arenarum*), new to the collection, presented by Mr. Wilfred Smithers. As compared with the month of January, 1915, there was an increase in the number of visitors of no fewer than 14,407, while the receipts showed an increase of 269*l.*

MISS L. H. HUIE makes an important addition to our knowledge of the parasitic Anthomyiid fly, *Hylemyia grisea,* in the *Scottish Naturalist* for January. Of the life-history of this insect little was previously known. Miss Huie now describes its method of oviposition in the burrows of the wild bee, *Andrena analis.* The larva, on hatching, makes its way to the brood chamber to feed upon the pollen stored for the larval bee, the fate of which in these circumstances has yet to be traced. The author in this communication not only adds materially to our knowledge of this insect, but she also, for the first time, records its presence in Scotland, where hitherto it has not been supposed to occur. In the same number Miss L. J. Rentoul and Miss E. W. Baxter record some useful notes on the moulting of birds in their winter quarters. While adopting the latest eccentricities of nomenclature in regard to the species described, the authors have neglected to acquaint themselves with the morphological terms which have been in use for the last twenty years or so in regard to the plumage.

THE January number of the *Zoologist* contains a valuable summary of the fishing industry at Great Yarmouth, by Mr. A. H. Patterson. The influence of the war is manifest on nearly every page of this report. Among other matters, it is mentioned that in consequence of the diminished fish supply dogfish are now esteemed as food-fishes, large quantities being now eaten locally with relish. The record catch of herring for a single boat was landed on November 1.

This was made by a Scotch boat, and represented some 280,000 herring. The Scotch vessels, indeed, earned enormous sums. While most of the fish taken were consumed at home, some were exported to France, and some to the United States. The Norfolk mussel industry has profited by the suspension of imports from Holland. During the season 87,500 cwt. were taken from the beds of the Boston and Lynn fisheries. The latter were raided by starfish of large size, and "small starfish . . . did much mischief to the brood muscles." This much may be gathered from the fact that as many as two and a half tons of these pests have been taken in one day.

THE improvement of tobacco cultivation in Bihar is one of the subjects which has engaged the attention of Mr. and Mrs. Howard, at the Agricultural Research Institute, Pusa, and their account of the industry with their conclusions is published as Bulletin No. 50, 1915, from the Pusa Institute. Attention at Pusa has been mainly concentrated on the improvement of indigenous varieties of tobacco, and a type has been discovered of light colour and good texture suitable for cigarette tobacco. Green manuring with Sunn hemp has also been found valuable on light, high-lying, well-drained soils. The importance of growing only one kind of tobacco and of growing even fields of the crop is insisted upon, the value of a single variety being evident since cross fertilisation is common in tobacco. The bulletin contains full particulars as to seed sowing, transplanting, manuring, and the principles of curing, for it is largely on the curing that the value of the tobacco depends.

PROF. BAYLEY BALFOUR describes fifty new species of Primula from China, Tibet, and the Himalaya in Notes from the Royal Botanic Garden, Edinburgh, vol. ix., No. xli. The Chinese and Tibetan species are from the collections recently made by Mr. G. Forrest and Mr. F. Kingdon Ward in particular, and Prof. Balfour deals critically with the micro-forms found in several of the Chinese species. A few species described have been collected by Mr. Reginald Farrer, and some also by Mr. Purdom. Among those of more particular interest may be mentioned *Primula alsophila,* Balf. fil. and Farrer, found in the highest woodland zone of the Tibetan forests, with long, creeping stolons running in the moss in which it grows. These stolons are traversed by a fungous mycelium, as is the case with the Pyrolas, among which this species grows, and no doubt through its guest fungus it is capable of absorbing the atmospheric nitrogen. Another striking species is *P. Viola-grandis,* Farrer and Purdom, from Kansu, belonging to the section Omphalogramma, the section bearing irregular flowers. This plant has thick flannel-like leaves and large pale-purple flowers, the three upper lobes lying back over the long tube and the three lower standing out stiffly, like those of a violet. Five other species of this section are known, and Prof. Balfour inclines to the view that this section should be placed in the genus Bryocarpum rather than in Primula.

To assist farmers to rear a larger number of calves and ultimately to increase our food supplies, the West of Scotland Agricultural College has recently carried out a series of calf-feeding experiments at the college farm, Kilmarnock. The report on these experiments by Mr. William G. R. Paterson and Mr. Lindsay Robb is issued as Bulletin No. 68. Four different rations were tested, viz.:—(1) Whole milk; (2) separated milk and crushed oats; (3) separated milk and maize meal; and (4) whey and a special calf meal. The value of these diets, as judged by the average weekly live weight increase of the calves in each group, came out in the order given, but the cost per lb. increase with whole milk was 7·0*d.*, against 3·5*d.* for separated milk and either crushed oats or maize meal. The whey ration was not a success. The calves did not like it, and it had a tendency to scour them. The lot fed on whole milk were naturally the best-looking all through the experiment, but the crushed oats group were very little behind. The trials showed that separated milk with either crushed oats or maize meal make suitable and economical rations for calves. It is advisable to feed solely on whole milk for the first four weeks, and to effect the change of ration gradually. These Scotch experiments make an interesting comparison with similar trials carried out by Dr. Voelcker at Woburn in 1912–14. Here the records were continued right up to the slaughter of the animals as two-year-old bullocks, and demonstrated in a striking way the superiority of crushed oats over all the other rations tested.

IN a recent note we remarked on the energy shown in America in the investigation of the problems of protozoa in the soil. Vol. v., No. 11, of the *Journal of Agricultural Research* contains a paper on the relative activity of protozoa in greenhouse and field soils. Mr. G. P. Koch has examined a number of soils in the endeavour to ascertain whether protozoa lead an active life in soils of different moisture content when the temperature is constant and when it is variable. The soil is stirred with a few drops of sterile water and examined under the microscope for two minutes only, thus avoiding errors due to rapid development of encysted forms, as pointed out by Martin and Lewin. According to the author, active protozoa do exist in greenhouse soils, but in very limited numbers, only six out of twenty soils examined showing a few trophic forms. Active protozoa are not found in field soils under normal conditions, but cysts invariably occur which become active in a favourable environment. The moisture content of the soil appears to be the chief factor in determining the presence or absence of active protozoa, while temperature, organic matter, and physical structure are of secondary importance. After heavy rain, when the soil is waterlogged, protozoa excyst and can be found in the active state in standing water. The time required for excystment was found to be longer than that given by previous workers. Small ciliates can excyst in one to two hours at 23° C.; at this temperature flagellates require six to eight hours and large ciliates forty hours. Both moisture and temperature appear to influence the period of excystment. Evidently the two-minute period of examination of each sample is well on the safe side. The author concludes that protozoa are too rarely active in field soils to operate as a limiting factor in crop production.

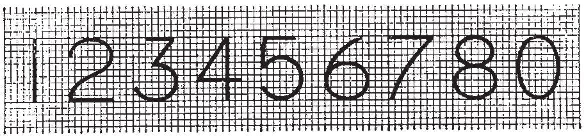
Earthquakes are not frequent in West Africa, but that they are not exceptional is the contention of M. Henry Hubert, who has a paper on the subject in *La Geographie* for November, 1915 (vol. xxx., No. 5). From the information he has collected, which he admits is incomplete, it appears that the region in which earthquakes are most likely to occur is between longitudes 4° and 6° W., which coincides with an area of highly folded metamorphic rocks. The earthquakes are seldom violent, but have been known to reach eight on the scale of De Rossi.

Tides tables for the eastern coasts of Canada and for the Pacific coast for 1916 have been received from the Department of the Naval Service of the Dominion of Canada. It is claimed that, on the basis of length of observation, the tables for the majority of the western ports of Canada are superior to those of any port on the Pacific coasts of America, Asia, or Australia. The tables for Prince Rupert are equal to those for San Francisco, which are based on the longest record of any published for the Pacific coast by the United States Coast Survey. In the case of the eastern ports the lengths of record for the ports of reference—Quebec, Father Point, St. Paul Island, Halifax, and St. John—are longer than those of any Atlantic United States ports. These pamphlets are apparently distributed free of charge to mariners.

The article by "G. H. B." in Nature of January 20 on the proposals regarding "Decimal Coinage and the Metric System" which appeared in the *Electrical Review* has called forth a rejoinder in the issue of that journal for February 4. Our contributor writes with reference to the remarks in the *Electrical Review*:—This correspondence has had at least one good effect, namely, that it has forced the writer of the articles in that journal to state clearly and definitely which system of decimal coinage he proposes to adopt. He would do well to remember that the name "decimal coinage" is vague and meaningless, since every country which has a small monetary unit divided into still smaller cents calls that system a decimal one. In the article in Nature the term was purposely discussed in its most general aspect, and if the writer in the *Electrical Review* considers this to be an indication of "confusion," he and other advocates of currency reform would do well to remember that they have only themselves to blame if endless confusion arises from their failure to adopt a more distinctive name for their system. We are now told that the proposal would not have any effect on international commercial transactions conducted on a large scale (the pound being unaltered), but that it would alter the copper coinage. The change in the latter would be far more confusing to the working classes and the poor than the mere doubling or halving which gave so much trouble in Austria, although it only involved renaming the kreuzer while still retaining the monetary value of that coin. The present reply fully confirms the main contention of our article, namely, that it would be a serious mistake to spoil our prospects of adopting international standards of weights and measures by associating them with a proposal of so fundamentally different a character.

The *Electrical Review* for February 4 contains an illustrated article on the laboratory for heating and ventilation, which has been opened at University College, London, under the charge of Mr. A. H. Barker. The equipment described consists mainly of apparatus for measuring temperatures, radiated and convected heat, the efficiencies of gas and electrical radiators, for testing hot-water pipes, for determining the slope of temperature through the walls to the outside, and for measuring the resistances of air ducts. Mr. Barker's laboratory appears to be the first one established by any university for the special study of the scientific problems of heating and ventilation, but some important pioneer work on the scientific treatment of ventilation was done by Sir Napier Shaw in the Cavendish laboratory at Cambridge twenty years ago. We welcome the inclusion of this work within the sphere of the University, and hope that ere long even those who now advocate the study of Greek verse as an unrivalled educational training will look on the scientific study of the problems underlying everyday life as worthy of some consideration.

Instrument-makers will find some useful suggestions in a short paper by Mr. A. P. Trotter in the Journal of the Institution of Electrical Engineers for February 1. In 1908, Mr. Trotter prepared some notes on the most suitable numerals for the scales of measuring instruments; these were recently placed at the disposal of the Meter Panel of the Engineering Standards Committee, and have now been published at their suggestion. Most of the figures which Mr. Trotter proposes as "standard" combine the maximum of legibility and convenience with a considerable degree of elegance; his 2, 3, and 7 are admirable. A more open 5, with the vertical and horizontal lines further to the right, may, however, be preferred; and this would enable the tails of the 6 and 9 (which it is proposed should simply be an inverted 6) to be set at a less violent and unconventional angle without danger of confusion between the 5 and 6; the extension of the horizontal bar of the 5 to the right, beyond the rest of the figure, would preserve its distinction from the 3. A slightly wider 4 would also be an improvement.



Numerals designed by Mr. A. P. Trotter, minimum thickness.

One of the principal effects of the war on chemical industry in this country has been to curtail largely the supplies of sulphuric acid available, and to produce an increased output of acid sodium sulphate or "nitre-cake." In many cases it would appear possible to utilise the nitre-cake as a substitute for sulphuric acid. The *Chemical Trade Journal* of January 29 contains an article dealing with the question. A special committee has been appointed in the West

Riding to devise regulations for the substitution of nitre-cake for sulphuric acid in various processes of the woollen trades, and to arrange for the best centres to which the Government Explosives Department can send quantities of nitre-cake for the convenience of local users. The greatest difficulty lies in carting and transport. It is pointed out that the shortage of acid seriously affected the wire trade of some districts, and that the Government, although taking action with regard to the textile trades, has apparently not yet realised how seriously the wire trade is affected by the shortage of acid.

THE final general memorandum on the indigo crop of 1915–16, based upon reports received from provinces containing practically the whole area under indigo in British India, has been issued by the Department of Statistics, India, and forms the subject of a short article in the *Chemical Trade Journal* of January 29. The total area (314,300 acres) is 112 per cent. in excess of the finally revised value of last year (148,400 acres). The total yield of dye is estimated at 39,900 cwt., as against 25,200 cwt., or an increase of 58 per cent. The average output per acre works out at 14 lb., as against 19 lb. in the preceding year. The increase in area is due to high prices of indigo due to the war, which range from 12*s.* to 13*s.* a lb., as compared with 2*s.* 8*d.* in 1913. The season on the whole has not been favourable to the crop, except in Madras. In some places poor crops were obtained owing to a scarcity of trustworthy seed at the sowing time. Data are given showing the quantities of natural and synthetic indigo imported into the United Kingdom in the last five years.

A PAPER on turbo blowers and compressors was read recently before the South Wales Institute of Engineers, and is reprinted in *Engineering* for February 11. The authors, Mr. H. L. Guy and Lieut. P. L. Jones, give very full details and methods of design for both classes of machines. There is also an appendix on the measurement of large quantities of air, and the authors state that the most convenient and accurate method consists in discharging it into the free atmosphere through a standard convergent nozzle. A drawing of this nozzle is given. Care must be taken that the air approaches the nozzle in a steady, uniform stream. It is only necessary to measure the temperature and pressure before and after the nozzle in order to be able to calculate the volume of air passing through it. The coefficient of discharge has been measured for the author's standard nozzle and has been found to be between 1·0 and 0·99.

MESSRS. DULAU AND CO., LTD., will publish almost immediately a translation of Thonner's "The Flowering Plants of Africa: an Analytical Key to the Genera of African Phanerogams." The work, which has been revised and brought up to date, will contain 150 plates.

THE Cambridge University Press has undertaken the publication in this country of two new American medical journals, viz., *The Journal of Cancer Research* and *The Journal of Immunology.* The first-named periodical (which will be issued quarterly) will be the official organ of the American Association for Cancer Research, and contain contributions dealing with statistics, immunology, pathology, and inheritance. The second journal will be a bi-monthly, and represent the American Association of Immunologists and the New York Society of Serology and Hematology.

THE following monographs are in preparation for publication by the Ray Society:—The British Centipedes and Millepedes, by W. M. Webb; The British Earthworms, by the Rev. H. Friend; The British Hydrachnidæ, by C. D. Soar and W. Williamson; The British Ixodoidea, by W. F. Cooper and L. E. Robinson; and The Earwigs of the World, by Dr. M. Burr. The three following works are in course of publication:—The British Desmidiaceæ, by W. and Prof. G. S. West; The British Freshwater Rhizopoda and Heliozoa, by the late J. Cash and G. H. Wailes; and The British Marine Annelids, by Prof. W. C. McIntosh.

## *OUR ASTRONOMICAL COLUMN.*

PERRINE'S COMET (1896 VII.).—This periodic comet is due to return to perihelion about the middle of April. Search ephemerides have been calculated by Dr. G. Stracke from orbital elements obtained from observations made during its 1909 apparition for three assumed dates of perihelion passage, namely, April 7·5, 15·5, and 23·5, and are given in Circular No. 500 of the *Astronomische Nachrichten.* The comet is apparently close to the sun on the opposite side from the earth, and at perihelion will be 200 million miles from the latter.

COMPARISON OF PENDULUMS.—The method of coincidences enables the rates of pendulums to be compared with considerable accuracy even without accessory apparatus. Using the "flash-box"—an optical device that enables the moment of coincidence to be determined with greater precision—estimations of one-thousandth of a second are usually made in gravity work. Seven significant figures are obtained in the deduced times of oscillation of "half-seconds" pendulums. An even higher order of accuracy is claimed for an electro-acoustical method tried by M. A. Perot (*Comptes rendus,* clxii., No. 5), that is stated to render sensible periods less than 1/250,000 of a second. The arrangement employed consists of a battery and condenser shunted through very high resistance, connected in parallel to two open circuits, including telephones. Contacts made by the pendulums under comparison make the circuits, and equality of the sounds given by the two telephones indicates coincidence.

THE VARIATION OF LATITUDE.—Prof. Kiyofusa Sotome, who for a number of years had charge of the latitude observations at Tokyo, suggests an explanation of the Kimura "*z*," also embracing the lesser-known term given by the chain-method of reduction, namely, the "closing sum." Both together are held to be a measure of the "imperfection" of the spirit-level. In the course of evaluating the micrometer screw by high-latitude stars, it was found that whether the zenith telescope was in the east or west position the bubbles of the pair of attached levels showed a southerly creep about four times greater in winter than in summer. For this two causes are found to be about equally operative; one resides in the spirit-levels and is independent of a regular northward tilt of the telescope that accounts for the other half. The varying inclination of the telescope is due to differential changes in the stand and also to a periodic diurnal